

## SOLUTIONS TO EXERCISES: THE LANGUAGE OF MATHEMATICS

- 1a. 3
- 1b.  $1 + 2$ ,  $3 + 0$ ,  $\frac{1}{2} + \frac{5}{2}$ , etc.
- 1c.  $4 - 1$ ,  $5 - 2$ ,  $3 - 0$ , etc.
- 1d.  $6 \div 2$ ,  $9 \div 3$ , etc.
2. two:  $2 = 1 + 1 = 3 - 1 = 6 \div 3$  etc.  
 six:  $6 = 4 + 2 = 9 - 3 = 12 \div 2$  etc.  
 zero:  $0 = -1 + 1 = 2 - 2 = 0 \div 7$  etc.  
 one:  $1 = \frac{1}{2} + \frac{1}{2} = 3 - 2 = 2 \div 2$  etc.
- 3a. The capital of Massachusetts  Boston.
- 3b. The capital of Massachusetts  Pittsfield.
- 3c.  $3 + 4$   7
- 3d.  $3 + 4$   8
- 4a. true
- 4b. false
- 4c. true
- 4d. false
5. Proper nouns are capitalized (Massachusetts, Boston). The first letter of a sentence is capitalized; a declarative sentence ends with a period.
- The solutions to 6 and 7 are combined:
- 6a. Carol; English noun
- 6b. Carol  loves mathematics; English sentence; sometimes true/sometimes false
- 6c. The name 'Carol'  begins with the letter 'C'; English sentence; true
- 6d. 7; mathematical expression
- 6e.  $3 + 4$ ; 'three plus four'; mathematical expression
- 6f.  $7$    $3 + 4$ ; 'seven equals three plus four'; mathematical sentence; true
- 6g.  $3 + 4$   7; 'three plus four equals seven'; mathematical sentence; true
- 6h.  $7$    $3 + 5$ ; 'seven equals three plus five'; mathematical sentence; false
- 6i.  $t$ ; 'tee'; mathematical expression
- 6j.  $t$   2; 'tee equals two'; mathematical sentence; sometimes true/sometimes false
- 6k.  $0$    $2 - t$ ; 'zero equals two minus tee'; mathematical sentence; sometimes true/sometimes false
- 6l.  $t - 1$ ; 'tee minus one'; mathematical expression
- 6m.  $t - 1$    $1 - t$ ; 'tee minus one equals one minus tee'; mathematical sentence; sometimes true/sometimes false
- 6n.  $t + t + t$ ; 'tee plus tee plus tee'; mathematical expression
- 6o.  $t - 0$    $t$ ; 'tee minus zero equals tee'; mathematical sentence; always true
- 6p.  $0$   1; 'zero equals one'; mathematical sentence; false
7. (See solutions to problem 6.)

8. EXP
9. EXP
10. EXP
11. SEN, ST/SF
12. EXP
13. EXP
14. SEN, ST/SF
15. SEN, T
16. TRUE: The name 'Julia' begins with the letter 'J'.  
FALSE: The name 'Julia' begins with the letter 'G'.  
ST/SF: Julia has red hair.
17. TRUE:  $1 + 2 = 3$     FALSE:  $1 + 4 = 3$     ST/SF:  $x = 3$
18. TRUE:  $x = x$     FALSE:  $x = x + 1$     ST/SF:  $x = 1$